The improvement of the sanitation services in Moshi (Tanzania)

L'amélioration des services d'assainissement de la ville de Moshi (Tanzanie)

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Abstract
Tanzania has created, since the mid-90s, an original institutional framework for water and sanitation management made of a mix of decentralized initiative and public control. This article presents this framework and its functioning on sanitation issues in the town of Moshi, a medium-sized town located on the south slopes of the Kilimanjaro Mountain. Findings are coming from a pluridisciplinary franco-tanzanian research program dedicated to these issues in 2002 and 2003. The objective of this work was to identify - through a regulation analysis of the sector and an analysis of households' needs and demand - the stakeholders of the sector and to study their behaviours and their interactions. Using the output of this program first trends of policies were elaborated during a workshop held in November 2003 with all the main stakeholders who could exchange their different perceptions of the problems and their ideas to solve them.

Résumé
La Tanzanie a mis en place dans les années 90 un cadre institutionnel original, décentralisé mais sous contrôle public, de gestion municipale de l'eau et de l'assainissement. Cet article décrit ce cadre et son fonctionnement dans le domaine de l'assainissement des eaux usées dans la ville de Moshi, capitale régionale de taille moyenne située aux pieds du Kilimajaro. Ces réflexions sont issues d'un programme de recherche franco-tanzanien conduit en 2002 et 2003 dont les objectifs étaient d'identifier et d'étudier les différents acteurs et leurs interactions à travers une analyse de la régulation du secteur et des besoins et de la demande des ménages. Un séminaire de restitution des résultats aux acteurs locaux organisé à Moshi en Novembre 2003 a par ailleurs permis d'élaborer des pistes de politiques publiques et de mettre en évidence les différentes perceptions qu'avaient les intervenants des problèmes posés et des relations entre institutions.

Introduction

Tanzania has created, since the mid-90s, an original institutional framework for water and sanitation management made of a mix of decentralized initiative and public control. This article presents this framework and its functioning on sanitation issues in the town of Moshi, a medium-sized town located at the bottom of Kilimanjaro Mountain. Findings are coming from a pluridisciplinary franco-tanzanian research program[1] dedicated to these issues in 2002 and 2003. The objective of this work was to identify the stakeholders of the sector and to study their behaviours and their interactions in order to define some possible policies in Moshi.

The originality of the Tanzanian institutional framework, which lies in the existence of an autonomous body (the Moshi Urban Water and Sewerage Authority), will be presented first. It will be shown that even if the creation of these authorities in 1998 seem to be a success, there are still institutional problems responsible for poor cooperation between the MUWSA and the Municipality, which manages the on-plot sanitation in town. On-plot sanitation represents 90% of the facilities in Moshi which are provided by local craftsmen. These other stakeholders have been studied too, particularly their prices, which will be compared in a second part to the households demand for new facilities – assessed by a willingness-to-pay survey. The last part of this article will then be dedicated to present the output of the workshop organised in November 2003. Based on the results of the research program, the objective of this meeting, in which all of the main stakeholders of the sector took part, was to define some possible trends for new policies on sanitation in Moshi.

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I. An original experience of autonomous management: the Moshi Urban Water and Sewerage Authority (MUWSA)

In the 60's, due to its relative wealth and its good level of equipments, the town of Moshi could be optimistic concerning the future of its public policy on sanitation. In 1974 a total coverage of the town by the sewerage network in 1994 was even imagined by a municipal report.

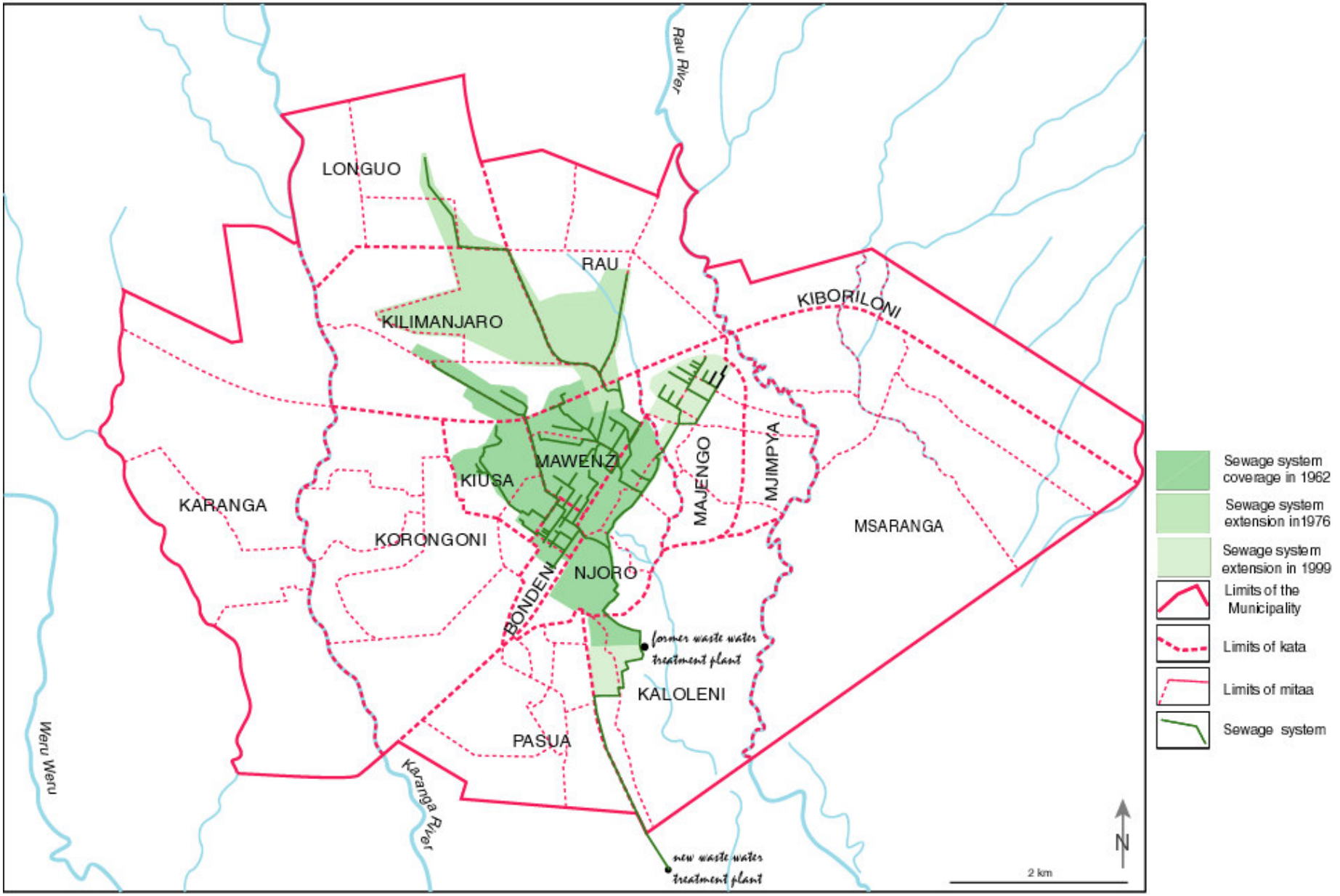
In 1995, after 20 years in which Tanzania faced a war, a severe economic crisis, important institutional changes in the water and sanitation sector and several structural adjustment plans, a report commissioned by the office of the Prime Minister and the first Vice-President warned local authorities about the possible emergence of “major health problems” related to waste-water pollutions.

In order to stop the constant degradation of the sanitary conditions in Tanzanian towns the governement initiated in 1994 an experiment of creation of autonomous bodies for the management of water and sewerage in three towns including Moshi. Influenced by the Tanzanian culture of social peace, the ambitions of justice inherited from the Ujamaa experience and the liberalization movement initiated by the international economic institutions, this experience led to the creation in 1998 of a new type of organisation with a high level of autonomy but under a strict ministerial control: the Urban Water and Sewerage Autorithies

I.1 The town of Moshi

Located in Chagga land, Moshi has been created in 1911 by the German occupant on the foot of the Kilimanjaro Mountain, in the North-west of Tanzania. Administrative capital and economic centre of the Kilimanjaro region - one of the richest of Tanzania - Moshi is getting its resources from the crops growing on the slopes of the mountain and from the tourism activity.

The surface of Moshi is 56 km^2 . The population of Moshi was increasing by 6 to 7 % per year from 1948 to 1988 and is now growing at a trend of 2,9% per year, its population was 144 336 in 2002



Map 1 Moshi - Sewage system evolution and coverage

I.2 Brief history of sanitation policies in Moshi and evolution of the national and local institutionnal framework

Examining the logic of establishing local autonomous body to manage water and sewerage (UWSAS) necessarily includes a critical look at the system, which it is attempting to replace. A system which for long and unsuccessful years tried to deal with sanitation problems in the urban areas of Tanzania.

In a legacy set up since colonialism the supply of water has been the responsibility of the Department of water in the Ministry responsible for water. Sanitation for its part has been the responsibility of town councils or Municipalities in the local government system. In Moshi, the first collective equipments for sanitation of waste water and excreta, including a treatment plant, were built between 1958 and 1962.

This system suffered from the decision by the central government to abolish the local governments in 1971. They were replaced by a "decentralized" system which in reality was a deconcentration of the central governement to the Regional and District levels instead of devolution of power to those areas. Sanitation had to get the attention of Regional and District Directors whose priorities were more with implementing policy directives from above dealing with other sectors, than with the local sanitation. In 1974 in Moshi, 30% of the households of Moshi were connected to the sewer network and the authors of the « Moshi Master Plan 1974-1994 » were writing that the town fulfilled all the necessary conditions to increase this rate to 100% before 1994… on the condition that the necessary funds were allocated to the extension of the network every year. The recommendations of this report have been very partially listened to; the network has been marginally extended in 1976.

According to Kironde, this "decentralization" made a bad situation worse (Kironde, 1999 p.110), its consequences were a serious deterioration of urban services and infrastructures illustrated by an outbreak of cholera in Dar Es Salaam in 1976. Local government authorities were therefore restored in 1982. The Urban Councils Act give Urban Authorities in the form of towns, municipalities and city councils mandate for both solid and liquid waste. This institutionnal change didn't make a big difference in Moshi. In 1980 a report commissioned by the « Ministry of Lands, Housing and Urban Development » set out some policies in order to increase the rate of connection to the sewer and to promote the use of ventilated improved pit latrines (VIP latrines). However, certainly because of the harsh economic situation of Tanzania in the early 1980's and the cut on public expenses planned by the World Bank and the IMF from 1986 onwards, most of these measures have never been taken. The situation was getting worse and worse in the end of the 80's. The situation became even harder from the early 90's when the waste-water treatment plant started to show malfunctions. The situation evolved in 1998: in parallel with the transfer of the sewerage network to the recently created MUWSA, a financial help from the International Development Agency led to a substantial improvement of the equipments (see below I.4.2).

The institutional framework which guides the Moshi Urban Water and Sewerage Autorithy (MUWSA) today which is based on autonomy and taking up a sewerage component came from trends which were emerging concerning the provision of potable water and sanitation services since mid 1980s but especially in the 1990s. Three different trends can be underlined:

- recognition of the limitations of providing urban water through a central government department;
- a renewed attention given to urban sewerage networks;
- a new form of decentralization.

Following these new paradigms the Tanzanian government initiated in 1994 an experiment of semi-autonomous water Authorities in three towns including Moshi. Theses new institutions could keep their sales receipts and receive subsidies. They were directed by an Advisory board and the member of the staff were civil servants. At the financial level, the authority had to pay for all the operation and maintenance costs but not for the salaries of the civil servants, investments and public purchasing of water.

This new organisation allowed to set the foundation for financial responsibility of the managing team and as the experience was successful a Water Works Ordinance was adopted in 1997. Following this new regulation Urban Water Supply and Sewerage Authorities were created in 18 towns in July 1998.

I.3 The current institutional framework: an autonomy under control

The creation of autonomous Authorities is part of a liberalization trend of the Tanzanian economy which began in the early 80s. Until these years, due to the Tanzanian socialist experience, the state was omnipresent at all levels of the economy and the statement of the necessity of promoting decentralized initiatives was even made before the IMF intervention.

However suspicion about private initiative is still important in Tanzania, partly because of the will to preserve public services and social justice inherited from the socialist experience. A culture of social stability is still strong and moderates the extent and the implementation of the reforms.

The creation of the Water and Sewerage Authorities should be analysed in this particular context. Under public control but with a wide authonomy, these institutions are quite original.

I.3.1 Institutions created by the ministry

The 1997 Ordinance open the possibilities in continuity with former regulations. The possibility to create water authorities has been indeed possible since 1962.

The minister is the one to decide the creation of a water authority (Art 3) and can suspend its autonomy. The freedom of the authority is therefore under control.

Article 3(2) of the Waterworks Regulations (Water Works Ordinance, 1997) stipulates that "The Water Authority so declared may be managed as:

a- an autonomous body

b- Public company

c- Private Company
d- Water use association
e- Cooperative society
f- non government association
g- any other body as approved by the Minister"

The solution of autonomous body has been chosen in 18 towns of Tanzania. This framework is quite similar to the "Etablissement Public" of French regulation: private-like management (financial autonomy, juridical personality) with public characteristics (juridical status, proceedings for management's appointment, control of the activity)

The management of an autonomous authority is made by a Board of Directors. The Board shall consists of 2 representatives of the State, 2 representatives of the Municipality, 5 representatives of the civil society and the Managing director of the Authority who shall be the Secretary of the Board. They are appointed by the Ministry for 3 years and are eligible for re-appointment. The Ministry can dismiss any of them.

I.3.2 The financial autonomy

The Board has important financial prerogatives. He can modify the prices of consumption or connection. Water price has been for instance increased in january 2000 (+33% for drinking domestic water) except, for social reasons, for collective taps. He can also decide cutoff of water distribution and it often uses this possibility.

However the Authority must deserve this liberty, if it fails to balance its accounts, the autonomy is reduced. There are 3 levels of autonomy depending on the ability of the Authority to cover different types of cost. The MUWSA has the highest level of autonomy.

I.3.3 Ministry's control : perfomance evaluation

The Ministry of Water closely monitors the activity of these decentralised bodies. It conducts and publishes an annual performance evaluation based on the information transmitted by the 18 Authorities.

There are 34 performance indicators evaluating the management, the level of services, the efficiency of the UWSAS, etc. A rating is made, based on these criterias, and particular comments and advices are sent with these ratings by the Ministry to the authorities. These ratings are also used to rank the 18 UWSAS.

I.3.4 On plot sanitation is still under Municipality's control

Even if sewerage network and treatment of waste is under MUWSA's responsability since 1998, regulation of on plot sanitation (which, will be treated bellow, represents 90% of the population) is still under the responsibility of the Health Department of the Municipality. Definition of indicative standards for building of equipments and management of cesspit trucks are its principal prerogatives. However

these standards are poorly known and used and the cesspit activity is insufficient and showing a deficit if depreciation allowance is taken into account.

This division of labor between the Municipality and the MUWSA create an obvious institutional confusion. The division between on-plot and collective sanitation is not pertinent because due to new policies people may be incited to shift from one system to another (creating competition between the two institutions) and also because the waste water collected by the cesspit trucks is poored inside the treatment pond managed by the MUWSA (see III.4.1).

I.4 The MUWSA: an organisation with a good ability to react

It has been shown that the financial autonomy is a condition of freedom of the Authorities. It is possible to evaluate this autonomy and Moshi's account analysis shows a good financial dynamic. The change in the sewerage policy in 2003 also shows that the MUWSA had a good ability to react

I.4.1 A strengthening financial autonomy

The criteria for financial autonomy is quite clear: the receipts of the Authority must cover all operation and maintenance costs.

From 1994/1995 to 2000/2001 the accounts of the MUWSA show a substantial increase of the receipts and a control of the costs. The operation and maintenance expenditures have indeed increased 6,6-fold while the receipts have increased 5,89-fold. Receipts were however in 2001 still 30% superior to these expenditures.

This can be explained by a substancial increase of the receipts of the MUWSA - due to prices increases, diminution of loss rate and increase of sewerage receipts- and a controlled increase of the operation and maintenance expenditures.

Finally, the authority seems to be able to release important funds for investment. Compared to the past situation of direct management by the departments of ministries, the creation of an autonomous authority is undoubtedly a progress, at least from a financial point of view.

I.4.2 New improved equipments

Thanks to a credit of the International Development Agency the sewerage network has been renovated and extended in the end of the 90's and a new sewage treatment plant is functioning since October 1999.

The network has been extended by 44%, it covers now 7,3% of the total surface of the town. The coverage rate of the population is however more uncertain, approaching 10% in March 2002.

It is estimated that 33% of the liquid waste daily produced in Moshi is collected and poured in the new waste-water treatment plant which only receives waste-water from the households. Industries are supposed to treat their own waste-waters before discharging them into the Karanga and Njoro rivers. In view of existing data the quality of this treatment seems to be questionable.

I.4.3 Little households reaction and new policies

After two years (at the beginning of the year 2002) the extension of the network sparked off less than 30 connections. According to the data collected, this poor response of the people's demand for this service can be explained, firstly, by a lack of information. The MUWSA seems to have understood this problem because an information campaign has been carried out in 2003.

The initial lack of an information campaign during the implementation of the extension of the network is symptomatic of a common habit of programme managers to take only into account the supply side of the project. This lack of demand analysis in the project design also explains the temporary failure of the programme: the price of connection was too high for 18% of the households interviewed and 28% said that this investment was the landlords' responsibility (see II.3.2). The last change on the price policy of the MUWSA, consisting in a decrease of the price of connection, could be a good answer to these problems.

Another policy which has been criticised by the representative of the Moshi Municipal council during the workshop in Novembre 2003 consists, by using Municipal by-laws, in threatening the people to expel them from their plot if they do not connect. Even if, as the MUWSA's representative underlined it, the Municipality because of its activity of cesspit emptying doesn't have interest in people's connection, we can have real doubts about the pertinence of "forcing" people to connect to the sewerage network.

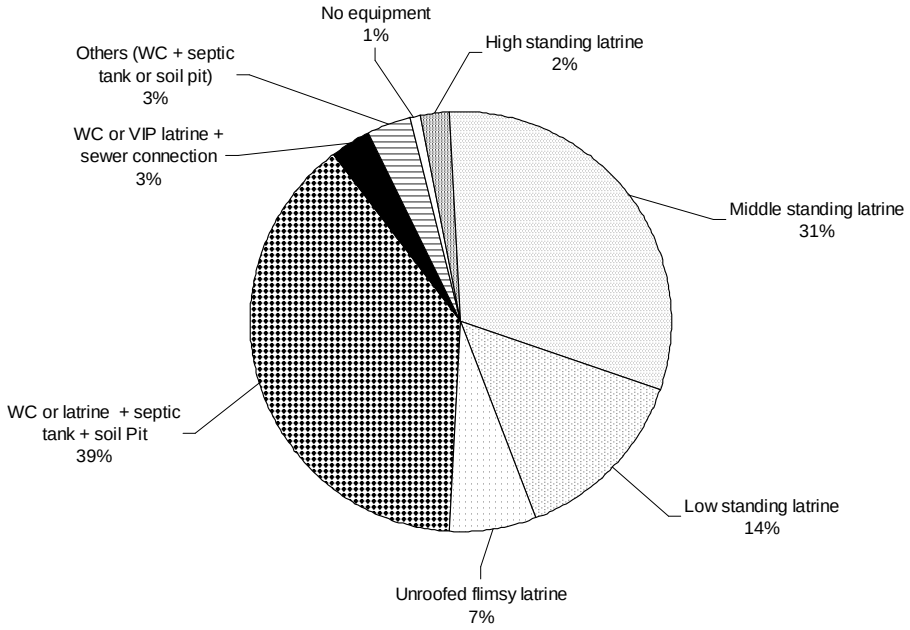
However any kind of new policies should be thought with a good knowledge of existing equipments and people's demand for new facilities.

II. People's needs and demand[2]

The overview of the institutional framework has left little space to talk about the inhabitants of Moshi. So far, all we know is that only 10% are connected to the sewerage network. From here onwards we will discuss aspects which are too often forgotten in investment projects for new facilities: existing equipments and demand for improved facilities.

II.1 Facilities for excreta disposal

Approximately 54% of the households interviewed have latrines (with different characteristics and standing) in their plot. The others are using systems which include a septic tank and/or a soil pit or a connection to the sewer. Almost no households (0.8%) have any equipment on their plot:



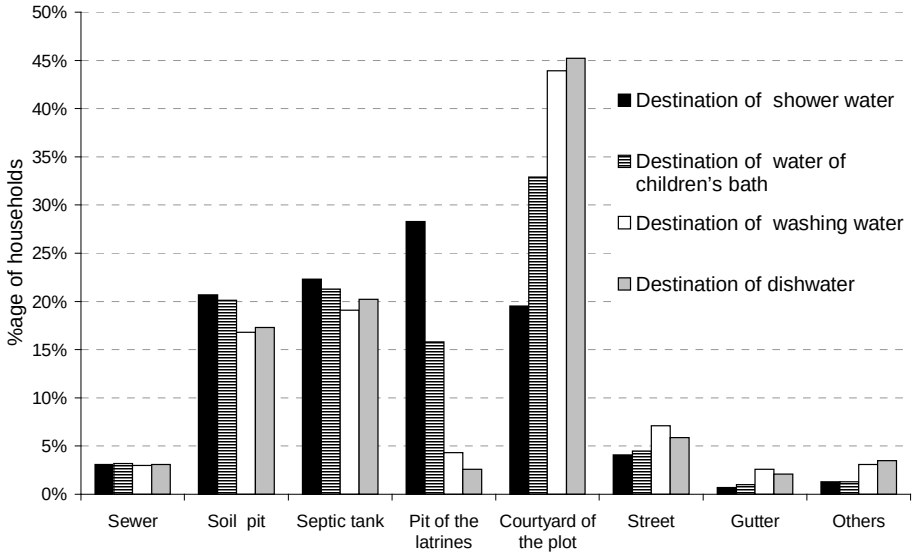
Graph 1 Type of sanitation disposals for excreta

People having a connexion to the sewer are few (3.2%) in the sample but they are under-represented due to the sampling procedure which excluded most of the town centre which is covered by the network, so the connection rate is undoubtedly higher (around 10%).

II.2 Practices and facilities for waste-water disposals

There are different kinds of waste-water; we will consider here the waste-waters coming from showers, dish-washing, clothes-washing and bathing of children. Apart for the people having a septic-tank and a soil pit or a connexion to the sewer the destination of waste water depends on the nature of the waste:

[2] All the data presented here come from the household survey



Graph 2 Destination of waste-waters

The existing facilities in Moshi are:

Soil pits: 45,6% of the people interviewed have one in their plot, 88.6% of these equipments are connected to a septic tank.

Septic-tanks: 41.3% of the households have a septic tank on their plot, 98.4% of the septic-tanks are connected to a soil pit.

Connection to the sewer: According to the different data, around 10% of the population of Moshi is living on a plot connected to the sewer.

In spite of the remarkable near-absence of households without any kind of equipment, around 50% of Moshi's inhabitants do not have their own waste water discharge installation and around 20% have only latrines in bad or very bad shape. Therefore there exists a clear need for improvement. We will now see to which extent these needs can be translated into demands for improved facilities.

II.3 Market characteristics

By using bargaining games we have collected data about the willingness to pay (WTP) of the households for different sanitation systems. As we also assessed the supply of sanitation systems through a craftsmen-survey, we are able to compare, for every kind of equipment, if the levels of demand of the people reach the prices of the market. We can see for instance if a real demand for connections to the sewer exists in uncovered areas.

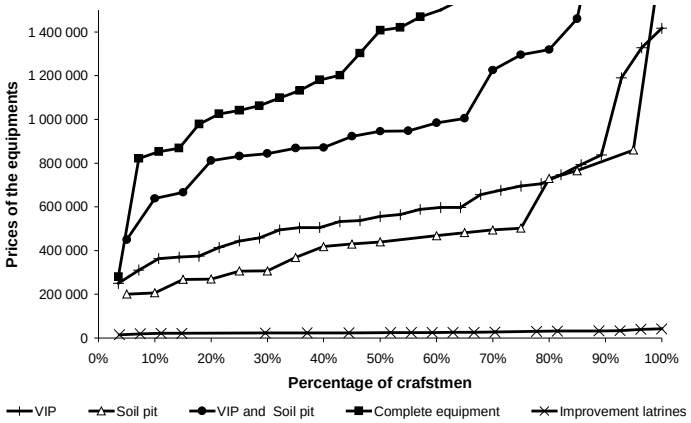
This analysis is market-driven, considering only what people can afford according to the current prices of the market. It therefore gives us an appraisal of the possibilities of improvements in Moshi in the current situation and of course shows how the sanitation situation may stay without any public intervention.

II.3.1 Prices of sanitation facilities[3]

The willingness to pay (and/or to work) was measured for six different solutions:

- Improvement of normal latrines to Ventilated Improved Latrines (VIP)
- Building of Ventilated Improved Latrines
- Building of a soil pit
- Building of a soil pit and a VIP
- Bulding of a soil pit and septic tank (complete on-plot equipment)
- Connection to the sewer

The prices given for this equipments by the 29 craftsmen surveyed are represented in the graph below. The curves represent the prices for all the facilities and can be read as follows, for the price of the soil pit for instance: 5% of the craftsmen gave a price of 200 000 Tsh, 40% of them gave a price equal or inferior to 400 000 Tsh and all of them gave a price inferior or equal to 1 700 000 Tsh.



Graph 3 Prices of on-plot sanitation equipments (in Tsh)

Graph 3 shows that the prices of the facilities vary a lot from one craftsman to another. We need however to choose a reference price to compare the craftsmen's supply with the demands. We will actually study the situation of the market with two scenarios: the first quartile price and the median price.

II.3.2 No investment from the tenants

According to the different data available, 50% to 75% of the households of Moshi rent their house, numbers which are quite surprising for this kind of town. This can be explained by: *« the commuting habit which the Moshi inhabitants have adopted, that is people moving in and out of the town for different socio economic activities during daytime and returning to rural areas (where their farms and residential premises are located) during the evening"* (Moshi Municipal Council, 1999). Thus all year long, people from the slopes of Kilimanjaro mountain are coming every day into town to work. Among these villagers, some are going back home every evening but others are renting rooms in town and settle there for an

[3] The unit of all the following numbers is the Tanzanian Shilling (Tsh). In April 2002 the exchange rate of the Tsh was one Euro for 900 Tsh.

indeterminate period of time. These people, however, do not forget their family house in the village and its surrounding *kihamba*. Due to its high symbolic value for the Chaggas (the local tribe), this plot on the slope remains most of the time more important than the rented house in town.

We can deduce from these habits a strong reluctance of the households to invest in an improvement of their urban settlement. Being tenants and therefore living on a land they don't own - and having moreover a house on the slopes- the people even generally express a categorical refusal to invest in any equipment like new sanitation systems: more than 80% of the tenants think that the improvement of the sanitation facilities is the landlords' responsibility.

II.4 Which facilities could be financed in rented plots?

Since tenants do not want to invest in improvements of their accomodation, any process to equip the plots with new sanitation systems must be initiated by the landlords. Different focus-group interviews have shown that landlords and tenants are willing to contribute financially to make improvements if costs are shared in the following way: the landlord pays the initial investment but, as a compensation, the tenants accept to pay a higher rent.

It was therefore relevant to study the willingness to invest of the landlords on their rented plots, their willingness to increase the rents after investment and, on the tenants side, the WTP for rent increases.

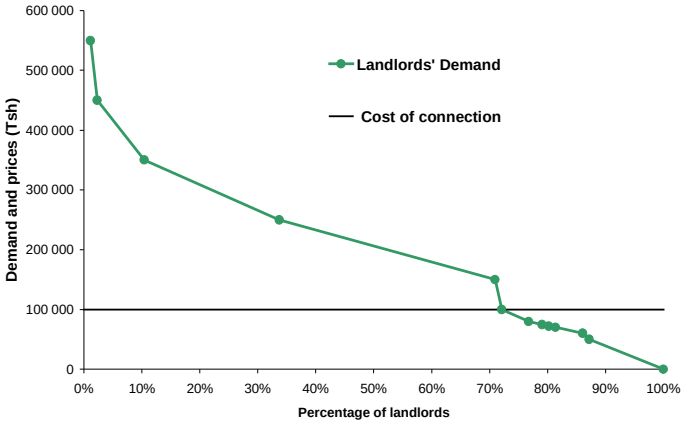
The comparison of the data collected concerning the rent increases shows that the willingness of the tenants to pay rent increases for sanitation improvements are globally superior to the rent increases that the landlords would make after investing in new equipments on their rented plots. We can then deduce from these results that tenants and landlords would be able to agree on rent increases after an investment of the landlord on the rented plot. Therefore, two obstacles could hinder the investment in the rented plots:

- problems of coordination between landlords and tenants coming from negative mutual perception,
- unwillingness or inability of landlords to invest in their rented plots.

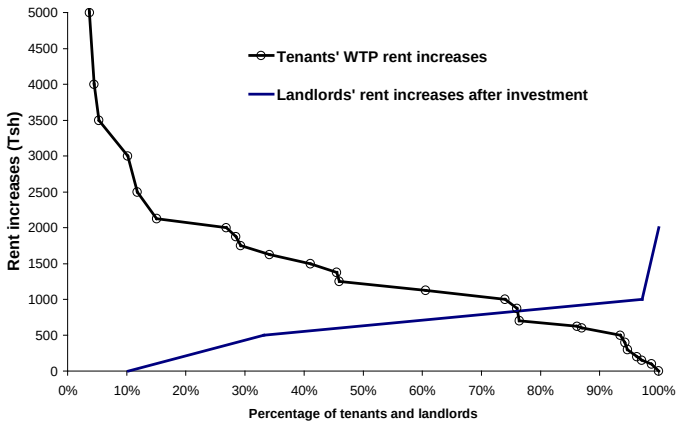
With a good coordination beetwen landlords and tenants, two kind of improvements could be financed in rented plots. The analysis of data shows that latrines could be improved in 40% of the plots and that a high demand for connection to the sewerage does exist in Moshi.

According to the MUWSA sewage engineer, since the implementation in 2002 of the new connection policies[4], all connection costs would now be under 100 000 Tsh. We can see that at this price level, a high percentage of the landlords would connect to the sewer:

[4] see I.4.3



Graph 4 Landlords' demand for connection to the sewer

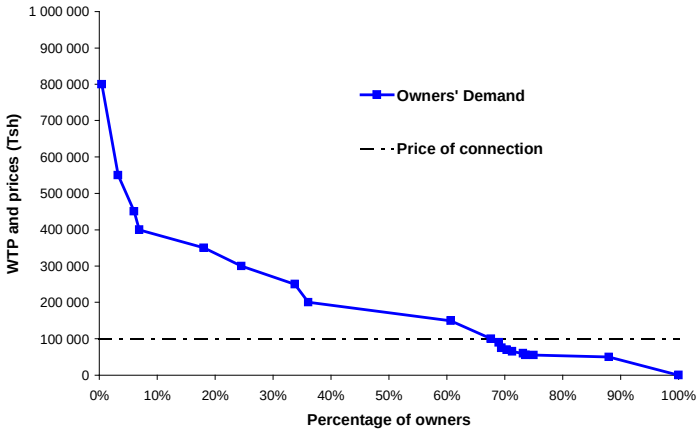


Graph 5 Supply and demand of rent increases after connection to the sewer

72% of the landlords would have the willingness to connect their rented plot if the cost was 100 000 Tsh (see Graph 4). The results of the tenants' survey moreover show that a real demand does exist on their part too (see Graph 5). After the landlord's investment, 75% of the landlords and the tenants would agree on a rent increase of 850Tsh per month and per room. This means that the connection to the sewer system would be possible for 55% of the rented plots if the cost was equal to 100 000Tsh and this opens interesting prospects on network extension.

II.5 Owners' demand for sanitation facilities

The improvement possibilities on plots inhabited by their owners are quite similar to those on rented plots. Approximately 20% of the owners could purchase a soil-pit and at the median price 40% of the owners could finance the improvement of their latrines. Moreover, as shown on Graph 6, approximately 70% of the owners would be willing to pay for the connection to the sewer.



Graph 6 Owners' demands for connection to the sewer (Tsh)

One of the objectives of the survey was to assess the willingness to work of the owners for equipment improvement. Results show that an important part (from 48% to 31%) of the households which own their

plot could participate in an improvement of their sanitation facilities on their plot by working on this improvement. In average these households would accept to work from 4 to 5 days.

As we have seen, demand for new equipments is concentrated mainly on improvement of existing latrines and connection to the sewerage system. This is not surprising since these were the only really new or innovative options.

These data offer immediate good prospects of network extension for the MUWSA and the possibility for the Municipality of implementing a public information campaign on latrine improvement. Looking at it from the opposite angle, these data also show that a significant number of households are unable to pay for the improvement of their equipment at existing market or MUWSA prices. Both aspects of this information are useful when designing future public policies.

III. Possible supply policies

These data on behaviours, equipments and demands of households have been the basis of a workshop held in Moshi in November 2003 with all the local stakeholders of the sector. These diverse and skilled participants included local stakeholders of the sanitation sector from four Tanzanian towns including Moshi ; water, sanitation and sewerage engineers ; researchers from various universities or research centres (UDSM[5], CREPAO[6], FIRA[7], Cooperative College[8]) and disciplines (economy, geography, political sciences, natural sciences) ; representatives of local and national Tanzanian authorities (Municipalities, District, Ministry of Water and Livestock Development, Water and Sewerage Authorities).

The objective of this workshop was to define some possible major trends of future publicly managed sanitation supply policies in Moshi. Most of the following conclusions are the output of this meeting.

III.1 Which kind of improvements could be promoted in Moshi ?

As commonly seen in research on sanitation or in programme implementation in this sector, the demand for sanitation services is divided into several segments and, more than a solution, it is a set of solutions that has to be found. The output of the workshop on this issue are sumarized in the following table:

Current equipment	Latrines wood/mud slab and poor pit	Latrines with poor superstructure	Middle standing latrines	Complete on-plot system (soil pit & septic tank)
Main problems	- poor hygiene - dangerous - not lasting	- poor hyigiene - not lasting	- odours - flies	environmental degradation
Solutions	Basic latrines with good pit and slab	- New facility - VIP latrines ?	Ventilation pipe	Sewage extension
	Condominium system			
Policy	Low cost system through subsidies	- providing low cost materials - subsidise ?	Information campaign	

Table 1 Summary of possible improvements in Moshi

III.2 How could these improvements or policies be financed ?

One of the local stakeholders of the meeting highlighted the problem of the capital needed to improve the sanitation systems. As the local institutions and government do not have enough resources to finance this, where could the funding be found ? Some possibilities exist in Moshi.

[5] University of Dar es Salaam
[6] Centre de Recherche et d'Etudes des Pays d'Afrique Orientale (Université de Pau et des Pays de l'Adour)
[7] French Institute for Research in Africa
[8] from Moshi

Contribution of the households:

First of all, we saw that the people can participate, to a certain extent, in the cost of the facilities - by contributions in money but also in labour. The willingness to pay survey showed for instance that up to 70% of the plots occupied by their owners could be connected to the sewer only with a contribution of the household. It is an interesting result but it also means that 30% are not able to pay that connection and that other funding must be found.

The water can pay on-plot sanitation

Due to the lack of detailed cost accounting it is not possible to identify the share of the costs arising from water supply and sewerage activities in the MUWSA accounts. However it is very likely that sewerage receipts do not cover the costs of this activity, which means that "water pays for sewerage". It could be envisaged to extend this system of cost-sharing to on-plot sanitation.

Coordination beetween landlords and tenants:

We saw during the survey that a lack of coordination beetween landlords and tenants could hinder the improvement of the sanitation situation in the rented plots. Their answers however show that they could find agreements in order to share the cost of an investment in their plot. Everything should therefore be done in order to facilitate the coordination beetween these two groups.

Condominium system or cost-sharing solutions:

The historical overview made above concerning the public policies on sanitation in Moshi wouldn't be really complete without talking about some initiatives of households living on plots located far from the sewerage network who were determined to finance collectively a part of the costs of connection to the main pipe and develop in their area a simplified sewerage (or condominium sewerage). When the network was under its responsibility, the Municipality had supported such initiatives. A technical and logistical support had been provided to the inhabitants of the area, who had agreed on cost sharing arrangements in proportion to their resources. Each household was contributing between 5 and 20% of the total cost.

The MUWSA, however, received and rejected, before 2002, three or four of these initiatives, because it did not want to change its pricing policy and feared possible conflicts which could emerge in these neighbourhoods. It seems that this reluctance has now disappeared since the MUWSA has recently accepted extensions of the network with cost-sharing solutions. These are not however real "condominium systems", mainly because the inhabitants are not responsible for the maintenance of the entire system in their neighbourhood.

External funding:

As seen with the extension of the sewerage network, external financial contribution to investments or programs are still necessary. As in the town of Tanga with the low-cost sanitation facility program funded by DANIDA, Moshi through the Moshi Sustainable Programme could implement new policies on sanitation. Funds are available but in november 2003 the Danish embassy was still waiting for proposals

to release them. It therefore seems that there is in Moshi, certainly due to administrative inertia, poor absorption capacity for external funds. This problem should be tackled in a broader institutional reform.

III.3 The need for environmental regulation

It has been shown that development of on-plot sanitation is necessary in Moshi to improve the sanitary situation. However these kind of equipments, because of the infiltration of waste water in the soil, may cause important environmental hazards like the contamination of underground water.

Therefore a zoning of the different kinds of sanitation in Moshi town which would avoid this type of situation would be necessary but would need reliable and updated data. However the **data available is very minimal** and does not reveal the state of matters in different areas of Moshi. There is no information on the soil types nor seepage or absorption capacities of Moshi soils in specific sites. The exact depths of the water table is not established and no hydrological study has been done in Moshi that would provide information such as how connected the aquifers are, flow, direction and velocity of water.

Data/information on groundwater and surface water contamination resulting from sanitary practices is not well established either. The Drilling and Dam Construction Company[9] only measures such parameters as PH, salinity, alkalinity, etc. but no biological test or measurements are made. Reasons most commonly given both by MUWSA and the drilling company, are that the test is expensive and they do not have the proper facilities (laboratories) to conduct such testing.

The sanitary engineer from MUWSA also said that his office does not have the necessary data for sewerage expansion for the specific locations and for charting out the volume of sewerage. He pointed out that because of lack of data this responsibility is usually given to a consultant who collects the data together with a contractor, who will be responsible for the construction, but it seems that the information never reaches the office…

Socio-economic, migration (between rural and urban areas) and equipments data are also needed for urban strategic planning.

The different institutions (Municipality, MUWSA, la Drilling and Dam Construction Company, Pangani river basin) which should work in this zoning are not cooperating. Their different prerogatives should be clarified in a new institutional framework in which the Municipality would be the regulatory body.

III.4 The necessary changes in the institutionnal framework

The bigger institutional challenge concerns on-plot sanitation which fall squarely on the Municipality and is likely to remain so for quite some time to come. MUWSA is unlikely to take the task of sanitation from the municipality because there is pressure from the Ministry to achieve certain performances. There are therefore two Ministries dealing with sanitation. The first of the Ministry of Water and Livestock Development and the second is the Ministry of Regional Administration and Local Government, which is

located in the President's Office. The first oversees MUWSA while the second oversees the Municipality. The two Ministries are connected by donors through programs, which deal with urban rehabilitation which have components of water and sanitation. The programs are located in one of the ministries and the coordination is not always evident. At policy level there is need for delineating more clearly the task of municipality in on-plot sanitation monitoring and the share of responsibility between the latter and the MUWSA.

III.4.1 An other illustration of institutional problems: the transfert of the management of cesspit trucks from the municipality to the MUWSA

The workshop showed the importance of - and the problems linked to- the service of cesspit trucks. Currently under the responsibility of Moshi Municipality, one trip is charged 20 000 tsh. This price includes 5000 tsh for the MUWSA, which manages the treatment pond into which the liquid waste collected is poured. During the discussions, a responsible of the Health Department of the Municipality, was complaining about it. She was pointing out that her institution has objectives of sustainability and support to the urban poor and this fee of 5000 tsh was hindering their efforts.

The representative of the MUWSA answered that the MUWSA has objectives of financial sustainability and as the maintenance of the treatment pond is costly they need resources. The fees for the discharge of liquid waste of on-plot sanitation facilities are part of these resources.

This debate illustrates the coordination problems between the two institutions in charge of the discharge of liquid waste from the on-plot facilities. Aware of this particular problem, the representative of the Ministry of Water and Livestock Development said that it could be interesting to reflect on the possibility of putting sewerage and cesspit-trucks services under the same authority. Following the logic of the recent institutional changes the MUWSA should get the responsibility of this activity however it doesn't mean that the influence of the Municipality should decrease, on the opposite it should have new prerogatives.

[9] The Drilling and Dam Construction Company is an independent ground water facilitator to individuals and institutions

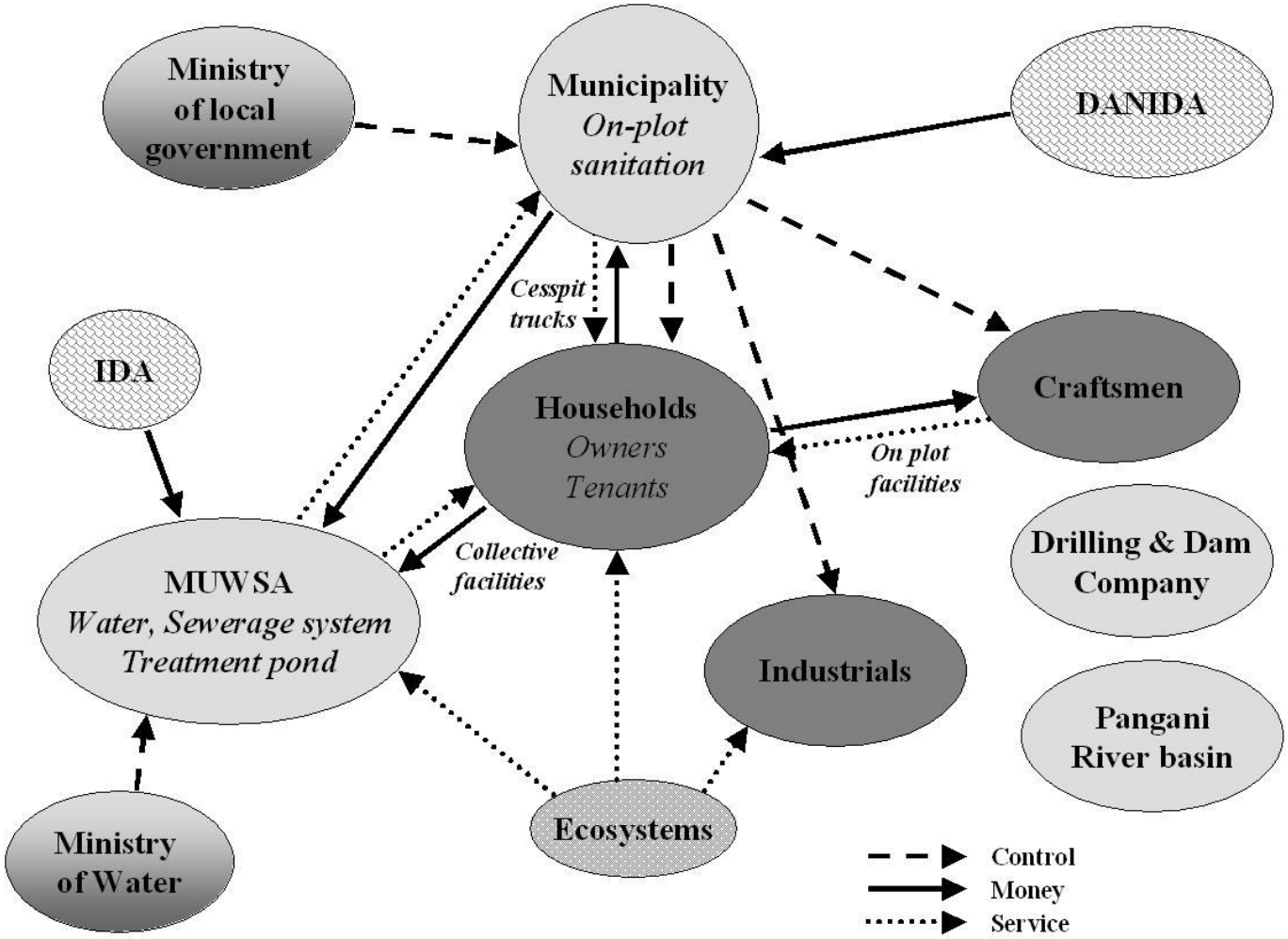


Figure 1 The institutional framework of sanitation in Moshi

III.4.2 Creation of a "sanitation department" in the Municipality

The relationship between MUWSA and the municipality is not very formal. The position of the municipality does not appear in the organizational structure of MUWSA. There is need to establish the formal link in the context of the global sanitation task of Moshi. Instead of the municipality being on the margins it should be responsible for charting out and monitoring the strategic sanitation issues of Moshi, including environmental matters. Without marginalizing any actors or acting in contradiction with MUWSA, a municipal "sanitation department" could chart out ways of involving appropriate actors in different aspects of sanitation in the different parts of Moshi municipality.

These institutional changes at local level would however be impossible without changes in the national regulation framework. The representant from the Ministry of water mentionned the importance of the regulation framework as it was highlited several time during the meeting. As this framework is source of problems of coordination beetwen the different institutions involved in water and sanitation, the ministry was planning to organise a forum with the main national stakeholders in order to revise this framework. On the same idea, the Tanzanian Water Policy of 2002 will be revised including a special chapter on sanitation.

These reforms which would clarify the regulation framework should achieve the reforms begun in 1994 with the creation of experimental autonomous bodies. The current framework creates a situation of latent competition between the municipality and the MUWSA where cooperation and common work must be the results of individual initiatives and good will of the actors. In the new framework the cooperation should be the norm in order to create a good atmosphere for new public policies.

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